

would, if collected, form in itself a goodly library. One of these most valuable reports forms the subject of the present notice, closely printed, teeming with information, and illustrated by a multitude of excellent woodcuts. The amount of sound biological teaching is very great, and put forward in a manner that renders it intelligible alike to the "scientist" and to those for whose benefit it is more particularly intended. The author notices all the insects (mostly in great detail) feeding on particular trees, such as oak, elm, hickory, willow, pine, &c., &c., without special reference, in the first instance, to the particular *species* of these trees. This is a good plan, for it is only occasionally that certain insects are attached particularly to certain species in a *genus* of trees: these are specially indicated under the larger headings. We have often found ourselves in a dilemma in attempting a notice of these American reports, and this condition is strikingly in force with regard to this one in particular. Almost without exception, they are sound and lasting additions to the scientific literature of entomology; this one is especially so. But then there is the economic side of the question to be considered, and that is the most difficult. Naturally every insect that is attached to a particular species of plant, by feeding upon it, may in a certain sense be said to be "injurious" to that plant. Thus, in this present Report, under "Willow" we find even the "Camberwell Beauty" (*Vanessa antiopa*) included in the list of enemies; but we are quite sure that no one (not even the author) seriously imagines that it (with myriads of other species mentioned) is an "injurious insect" from an economic point of view. Certain insects feed on certain plants, and will eat no other; if the plant is exterminated, the insect disappears, and to keep up the balance of nature, it is quite possible that if the insect were exterminated in the first instance, some more destructive enemy (or disease) might eventually attack the plant. But the greater part of the enemies to trees commit their ravages by attacking the wood or bark, and here especially we think economic entomologists keep too much in the background the fact that many insects (and many of those here under consideration) act mainly the rôle of scavengers. Undoubtedly a leaf-feeder often attacks the most healthy trees, and as a rule it only becomes really injurious when present in extraordinary numbers; but with regard to what may be termed lignivorous insects, we strongly incline to refuse to see in the insect itself (in the majority of instances) the initial cause of the unhealthy condition; on the contrary we regard it as only stepping in to hasten decay commenced by causes quite unconnected with its presence. Our author, apparently unconsciously, virtually acknowledges this in his suggestions of remedies with regard to a beetle infesting the spruce (p. 277), and also elsewhere, by recommending, above all, preventive measures, these consisting in destroying all dead and dying trees, in which the insects especially abound. An unhealthy condition of the tree is the most favourable for the development of the beetle; but we are not of those who suppose a prescience in the latter which induces it to attack healthy trees for the benefit of prospectively remote generations of its descendants.

We wish Dr. Packard had not gone out of his way to coin worse than useless "*English*" names, many of which must prove more difficult to the class for whose benefit they are intended than are the scientific ones. With this exception, we thank him heartily for having produced a most valuable report. R. MCLACHLAN

The Law of Kosmic Order: An Investigation of the Physical Aspect of Time. By Robt. Brown, jun. (London: Longmans, Green, and Co.).

A SHORT while ago we gave an account of the origin of the zodiacal signs so far as recent Assyrian researches enable us to determine it. Mr. Robert Brown has now

published a little book on almost the same subject, the object of which is to trace the mythological conceptions to which the names given to the signs by the Accadians were due. He comes to the conclusion that the year was regarded by them as an extended nycthemeron, half the signs being diurnal or relating to the deities of day, and the other half being nocturnal, concerned with myths of the night. Early man thus recognised that there was one and the same law of "Kosmic Order" pervading all conceptions of time. In the course of his investigation Mr. Brown draws upon Egyptian and Iranian sources, but his chief materials are necessarily derived from the monuments of ancient Babylonia. Unfortunately the progressive nature of Assyrian study often renders what was written on the subject a few years ago more or less obsolete, and hence it happens that some of the statements on which he relies have been corrected or modified by subsequent research. Thus the name of the second zodiacal sign, as has already been mentioned in NATURE, meant "the directing Bull" in Accadian rather than "the propitious Bull," as Mr. Brown gives it. It is true that the word had both significations, but the signification of "propitious" was a later and derivative one. The name of the seventh sign again was "illustrious mound," not "illustrious altar," and seems to have referred to the story of the Tower of Babel, whose building was placed at the autumnal equinox, while the builder himself was called "the king of the illustrious mound." Such corrections, however, seldom, if ever, touch Mr. Brown's arguments or diminish the value of his interesting book. We can thoroughly recommend it to those who care to study a curious chapter in primitive astronomy.

Uganda and the Egyptian Sudan. By the Rev. C. T. Wilson, M.A., F.R.G.S., and R. W. Felkin, F.R.G.S. Two vols. (London: Sampson Low and Co., 1882.)

THIS double narrative is one of great interest. Mr. Wilson was one of the Church Missionary Society's missionaries sent out to King Mtesa on account of the favourable report of Mr. Stanley with regard to the eagerness of the Uganda potentate for instruction. Uganda, our readers will remember, is a district on the north and north-west of Victoria Nyanza, visited long ago by Speke, when Mtesa was quite a youth. Mr. Wilson's stay extended over two years, 1877-79. During that time, he had excellent opportunities of becoming acquainted with Uganda and the Victoria Nyanza and the districts on its south shores. He reached his destination by travelling west and north from Zanzibar, and was favourably received by Mtesa. He had much intercourse with that monarch, and gives a very rational estimate of his character, not by any means so enthusiastic as that of Mr. Stanley. Mr. Wilson's notes of his journey contain many additions to our knowledge of the region he traversed. The most important part of his narrative is that which relates to the country and people of Uganda. His chapters on Life in Uganda, on Uganda and the Waganda, and on the government and language of the Waganda, are full of fresh and interesting information, and will be valued both by ethnologists and geologists. Mr. Wilson is a favourable type of the missionary, thoroughly practical, a good observer, and a hard worker. He collected many specimens of plants, a list of which is given in the appendix, with vocabularies, and meteorological and hypsometrical observations. Mr. Felkin reached Uganda by proceeding from Suakin to Berber on the Nile, and up that river to Uganda—the first time that the Victoria Nyanza had been reached by that route. Both he and Mr. Wilson returned to Suakin by making a circuit round by the sources of the Bahr-el-Arab, and across by Obeid to the Nile. They accompanied the ambassadors sent by Mtesa to this country. Mr. Felkin's notes on the hydrography and natural history, as well as on the social and political condition of the country

traversed, are of much interest. The work is well supplied with good maps, and has a number of good and useful illustrations. It is well worth reading.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Dr. Siemens' Solar Hypothesis

I HAVE been waiting for several weeks for answers to the following rather obvious objections to Dr. Siemens' Solar Hypothesis, but I have not seen them either asked by others or answered by Dr. Siemens.

1. How the interplanetary gases near the sun acquire a sufficient radial velocity to prevent their becoming a dense atmosphere round him?

2. Why enormous atmospheres have not long ago become attached to the planets, notably to the moon?

3. Why the earth has not long ago been deluged when a constant stream of aqueous vapour that would produce a rain of more than 30 inches per annum all over the earth must annually pass out past the earth in order to supply fuel to be dissociated by the heat that annually passes the earth?

4. Why we can see the stars although most of the solar radiations are absorbed within some reasonable distance of the sun?

GEO. FRAS. FITZGERALD

40, Trinity College, Dublin, May 16

I HAVE the pleasure to reply to the very pertinent questions put by Prof. FitzGerald as follows:—

1. The gases being for the most part hydrogen and hydrogen compounds have a low specific gravity as compared with the denser gases forming the permanent solar atmosphere. On flashing into flame in the photosphere, their specific gravity would be vastly diminished, thus giving rise to a certain rebound action which coupled with their acquired onward motion, and with the centrifugal impulse they receive by frictional contact with the lower atmosphere, constitutes them a surface stream flowing from the polar to the equatorial regions, and thence out into space. (Lest I should be misunderstood, allow me to add that I do not look upon centrifugal action as sufficing in any way to overcome solar gravitation.) Astronomers are in the habit of regarding each spheroid possessed of an atmosphere as rotating in vacuous space; under such circumstances the atmosphere must partake of the rotatory motion of the solid spheroid, and after having attained an increased depth at the equator, will assume a state of static equilibrium unless disturbed by external influences. No such statical equilibrium is possible, however, if we assume the same spheroid with its atmosphere, surrounded by an ocean of indefinite dimensions, consisting of gaseous matter not partaking of the rotation of the spheroid, although subject to its attractive influence. Equal masses will under those conditions be equally attracted both in the polar and equatorial direction, and the continued disturbance of equilibrium by rotatory motion must result in continuous outflow. Nor need this outflow be accomplished entirely at the expense of rotatory motion of the spheroid because the inflowing polar current when once established, will only have to be changed in direction by frictional action in order to convert it into the outflowing current.

2. Regarding the second question, I assume that the atmosphere of each spheroid in space is precisely such as would result from its mass, and if this view is correct, the moon also must have an atmosphere, though of so attenuated a character as to be scarcely perceptible by means of optical instruments; for as Wollaston put it in his celebrated paper, read before the Royal Society in January 1822, "it would not be greater than that of our atmosphere is, where the earth attraction is equal to that of the moon at her surface, or about 5000 miles from the earth's surface." I am well aware that in assuming atmospheric air to be a perfectly elastic fluid, the atmospheric density would at a height of only 70 kilometers not exceed the 1-7000th part of atmospheric density, and would therefore at greater distances

become inappreciable; but we have evidence to show that Boyle and Mariotte's law holds good only within comparatively narrow limits, and there is other evidence referred to in my paper in favour of the supposition that such gases as are contained in meteorites are diffused through space in appreciable amounts, or the meteorites could not for millions of years have retained these gases, notwithstanding the action of diffusion into empty space.

3. The amount of vapour that would condense upon the earth under the conditions here assumed, would depend upon its mean temperature on the one hand, and on the vapour-density of the stellar atmosphere surrounding it on the other. Assuming the density of the stellar atmosphere, which, while surrounding the earth does not partake of its rotatory motion to be 1-10,000th part of atmospheric density, and saturated with aqueous vapour, the point of condensation would be according to Regnault -50° C., if the outer regions of our atmosphere should be at that temperature, and saturated with aqueous vapour, the two would be in diffusive balance; if they were at a lower temperature they would acquire, and if at a higher they would part with aqueous vapour to the surrounding medium.

4. It has long been held by astronomers that there are stars beyond our range of vision, which hypothesis would involve that of absorption of heat and light rays in stellar space; some rays are more easily absorbed than others; thus it appears to be the yellow rays which are most efficacious in the decomposition of carbonic acid and aqueous vapour in the vegetable cell. May not the same conditions prevail in space, and allow probably the rays of highest refrangibility to pass on to the greatest distance without being absorbed—I should say utilised—in doing chemical work?

C. WM. SIEMENS

12, Queen Anne's Gate, S.W., May 22

Porculia Salvania (Hodgson)

A MOST valuable and interesting addition has recently been made to the Zoological Society's collection in Regent's Park, of four—a male and three females—Pigmy Hogs (*Porculia salvania*, of Hodgson) from the Doars of Bhutan. The extreme rarity and difficulty of procuring this animal makes its presence here of the greatest interest, and these individuals will be examined eagerly, not only by naturalists, but by many Indian travellers, sportsmen, and others, who have heard of, but never had the opportunity of seeing the pigmy hog. My attention was directed to it many years ago by the late Mr. Blyth, then in Calcutta, who on my first expedition to the Nepal Terai, in 1855, requested me to endeavour to obtain a specimen—as far as I remember, neither Blyth nor Jerdon had seen it living—Hodgson, who described and named it, had heard of its existence from the Nepalese or other denizens of the Terai, or neighbouring localities, long before he obtained a specimen. I was unable to procure one, though I made repeated attempts to do so, and enlisted many influential friends in the search, but without success; very few appeared to know even of its existence, whilst many seemed to regard it as mythical. Occasionally I met with natives who said they had heard of it, but I began to fear that it might be extinct. The four fine specimens now in the Gardens prove that such is not the case, and will furnish opportunity of supplementing Hodgson's description of the animal, which is to be found in the *Proceedings* of the Zoological Society, and in Jerdon's "Mammals of India."

These lively little pigs, weighing probably hardly as much as a hare, are most active and energetic; they resemble the ordinary pig in miniature, but probably may have some anatomical peculiarity which will interest naturalists as regards affinity with the Peccaries. The specific designation *Salvania*, is from the Sal (*Shorea Robusta*), as the pig is, I believe, found in that part of the Terai and along the sub-Himalayan tracts, where the Sal tree abounds, and among the long grass in which the little creature hides itself. It is much to be hoped that they will breed, and thus enable other zoological collections to be supplied with specimens of a most rare and interesting species.

J. FAYRER

Pseudo-Glacial Phenomena

I BEG to call the attention of geologists to the following facts:—On the north-east coast of Australia, at the end of Trinity Bay, about lat. 17° S., there are steep ranges of granite abutting on the sea-margin. Every rainy season (December, January, and February) immense quantities of the granite